UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
EUGENE DISTRICT

ENVIRONMENTAL ASSESSMENT NO. OR090-EA-99-07
B-HAPPY COMMERCIAL THINNING

I. INTRODUCTION

This Environmental Assessment (EA) will address a proposed commercial thinning within the Wolf Creek Watershed. The Wolf Creek Watershed is located in Lane County, southwest of the city of Eugene. The watershed lies at the eastern headwaters of the Siuslaw River Basin within the Coast Range Province. The proposed project area is located in Section 33, Township 18 South, Range 6 West, Willamette Meridian, Lane County, Oregon, within the Matrix land use allocation (LUA) and includes management objectives for both the General Forest Management Area (GFMA) and Riparian Reserves within the Wolf Creek Watershed.

The watershed contains approximately 37,891 acres of which the Bureau of Land Management (BLM) manages approximately 16,688 acres or 44% of the watershed. The pattern of the current landscape in the Wolf Creek Watershed is largely influenced by the checkerboard ownership pattern. The proposed project would remove approximately 7.85 million board feet (MMBF) from approximately 434 acres of commercial thinning (includes road right-of-ways). The proposed action would also include treatment within the Riparian Reserve.

A. CONFORMANCE

The proposed action and alternatives are in conformance with the *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl, April 1994 (ROD)* , and the *Eugene District Record of Decision and Resource Management Plan, June 1995 (Eugene District ROD/RMP)* to which this document is tiered. These EIS's are incorporated by reference.

Watershed analysis has been completed for the Wolf Creek Watershed. The watershed analysis identified the opportunity for silvicultural treatments within the Riparian Reserves to accelerate the growth of trees for the attainment of the ACS Objectives. This treatment is consistent with ACS Objectives *(ROD pages B-11 to B-13)*.

On November 4, 1996, *Interim Guidance for Survey and Manage Component 2 Species: Red Tree Vole* was issued to implement component 2 of the Survey and Manage Standard and Guideline under the Northwest Forest Plan Record of Decision (*BLM Instruction Memorandum No. OR-97-009*). This memorandum contained both the management recommendations (interim guidance) and the survey protocol for the red tree vole. *Instruction Memorandum No. OR-98-105* extended the interim guidance through FY 99 or until superseded by revised direction. The Proposed Action and alternatives are in conformance with this guidance.

Plan maintenance documentation postponing surveys for 32 Component 2 and Protection Buffer species was recently completed (*Plan Maintenance Documentation, USDI Bureau of Land Management, To Change the Implementation Schedule for Survey and Manage and Protection Buffer Species*, approved March 3, 1999). The Proposed Action and alternatives are in conformance with the direction provided in the Plan Maintenance Documentation. The implementation of the plan maintenance is provided for by BLM planning regulations (*43 CFR 1610.5-4*).

The effect of the plan maintenance action was analyzed in an environmental assessment, *To Change the Implementation Schedule for Survey and Manage and Protection Buffer Species*, issued October 7, 1998 (*Schedule Change EA*). The analysis contained in the Schedule Change EA is incorporated into this document by reference. Both the Schedule Change EA and the Plan Maintenance Documentation are available for viewing at the Eugene BLM District Office or on the internet at *http://www.or.blm.gov/nwfp.htm*.

B. MANAGEMENT OBJECTIVES AND GOALS FOR LAND WITHIN THE MATRIX (GFMA)

The following are the primary goals and objectives of the Matrix (GFMA and Connectivity) land use allocation (*Eugene District Rod/RMP, June 1995):*

- < Produce a sustainable supply of timber and other forest commodities to provide jobs and to contribute to community stability.
- < Provide connectivity (along with other allocations such as riparian reserves) between Late-Successional Reserves.
- < Provide habitat for a variety of organisms associated with both late-successional and younger forests.
- < Provide important ecological functions, such as dispersal of organisms, the carryover of some species from one stand to the next, and maintenance of ecologically valuable structural components, such as down logs, snags, and large trees.
- < Provide early-successional habitat.

C. MANAGEMENT OBJECTIVES AND GOALS FOR THE RIPARIAN RESERVE

"Under the Aquatic Conservation Strategy, Riparian Reserves are used to maintain and restore riparian structures and functions of streams, confer benefits to riparian-dependent and associated species other than fish, enhance habitat conservation for organisms that are dependent on the transition zone between up slope and riparian areas, improve travel and dispersal corridors for many terrestrial animals and plants, and provide for greater connectivity of the watershed". *(ROD B-13)*

D. PURPOSE AND NEED FOR ACTION

The purpose of the proposed action is to provide forest products while maintaining or enhancing the productivity, sustainability, and diversity of the forest ecosystem. The need for the action is established in the *Eugene District ROD/RMP* which directs that timber be harvested from Matrix lands to provide a sustainable supply of timber. The opportunity for silvicultural treatments within the Riparian Reserve to restore large conifers and promote future attainment of Aquatic Conservation Objectives (ACS objectives) is established on page 9-4 of the *Wolf Creek Watershed Analysis (February, 1995)*.

II. ALTERNATIVES INCLUDING THE PROPOSED ACTION

This section describes the Proposed Action and Alternatives developed through the interdisciplinary team (ID Team) review process. The Proposed Action and Alternatives consider forest management activities including commercial thinning; density management within Riparian Reserves; spur construction; road improvement; road renovation; and gating and barricading of roads after project completion.

A. ALTERNATIVE 1 - PROPOSED ACTION (COMMERCIAL THINNING TO INCLUDE DENSITY MANAGEMENT WITHIN RIPARIAN RESERVE)

The proposed action, known as the B-Happy Commercial Thinning, is located in T.18 S., R. 6 W., Section 33. The proposed action would remove approximately 7.85 million board feet (MMBF) of timber from approximately 434 acres of second growth Douglas-fir forests with an approximate birthdate from 1952 - 1959 (40 - 47 years old). The project area is predominantly dense Douglas-fir. The current stocking density of the stand is approximately 160 trees per acre (TPA). Minor components of the stand within the project area

include western hemlock, western redcedar, and hardwoods. The project area is within the Matrix land use allocation (LUA) and includes management objectives for both GFMA and Riparian Reserves.

UPLAND COMMERCIAL THINNING

The upland treatment would be commercial thinning. The objectives of this thinning are to accelerate growth on residual trees and enhance stand development by moving this densely stocked stand toward a more desirable condition. Spacing of the remaining trees after thinning would be approximately 20-23 feet. Approximately 80-105 trees per acre and a stand basal area of 125 to 135 sq./ ft./ ac would be retained. Leave tree selection would favor the retention of large dominant and codominant conifers. All pacific yew, western redcedar, and hardwoods would also be retained for the species diversity they provide (Design feature 12).

Yarding would be accomplished by cable or tractor. The Purchaser would have the option of using ground-based equipment (tractor) on slopes less than 35 percent. All yarding would be to designated or approved landings. (See design features 9-14 for additional cable and tractor yarding requirements.)

RESERVES

Riparian Reserves - The height of one site-potential tree in the Wolf Creek Watershed has been determined to be approximately 210 feet slope distance. Riparian Reserves (widths of 210 feet on either side of non-fish bearing streams, and 420 feet on either side of fish bearing streams) would be managed in accordance with the standards and guidelines in the *ROD (Standards and Guidelines C, pp. 31-38)* and the *Eugene District ROD/RMP*. Density management would occur within the Riparian Reserve with the proposed action.

Approximately 128 acres of the Riparian Reserves would be treated. Leave tree retention within the Riparian Reserve density management treatment areas would average 120 to 130 sq. ft. per acre of basal area with an approximate residual tree spacing of 21-25 feet (70-95 trees per acre). Leave tree selection would favor the retention of large dominant and codominant conifers.

No new road or spur construction would occur within Riparian Reserve. The proposed action would use the existing 19-6-9.1 (B-Line road), 18-6-33 and 18-6-33.1 roads within the Riparian Reserve (see EA project map). The existing 18-6-33.1 road would require renovation before use. All streams would be protected consistent with the Eugene District ROD / RMP and in accordance with the Aquatic Conservation Strategy.

Downhill yarding of logs to landings on the existing 18-6-33.1 road within Riparian Reserve would be necessary to access thinning within the upland and Riparian Reserve north of the road. Cable yarding with one-end suspension would be required when yarding through Riparian Reserves.

The design features on pages 6-8 further describe the proposed action within Riparian Reserves (ie. yarding methods and requirements; provisions for down wood, snags, and tree species diversity; and no-treatment buffers).

Survey and Manage Mollusk Reserves - The Survey and Manage Mollusk sites listed in the design features section would receive reserves or buffers to reduce edge effects and disturbance to these species. The selection of which locations to protect with reserves would be guided by all expressed resource concerns. No disturbance would occur within the 42 survey and manage mollusk reserve areas. All tree felling would occur directionally away from these reserve areas and no yarding would occur through these reserve areas. Prescribed burning, site preparation, tree planting, and salvage logging would not occur in these reserve areas. These reserves are described in greater detail under *Wildlife* within *Section IV Affected Environment* of the EA (Also see design feature 19.)

Survey and Manage and Protection Buffer Species -Botanical Reserves - Survey and Manage Botanical sites would receive reserves or buffers to reduce edge effects and disturbance to these species. No disturbance would occur within the sites reserved. All tree felling would occur directionally away from these reserve areas and no yarding would occur through these reserve areas. Prescribed burning, site preparation, tree planting, or salvage logging would not occur in these reserve areas. These reserves are described in greater detail by

species under botanical resources within the *Affected Environment* section of the EA (also see design feature 20)

ROAD ACCESS

The road system would include new construction of temporary spurs, totaling approximately 10,185 feet (2.0 miles). All new spurs constructed would be built during the dry season to approximately a 14 ft. width and would be dirt surfaced. No new stream crossings would occur with the new spur construction. Each new spur constructed within the project area would be decommissioned during the same dry season it is constructed by subsoiling and would not over-winter. This would require the new spur construction, and decommissioning to occur in stages over the life of the timber sale contract due to the size and scope of the project and project area. Spur construction and decommissioning during wet weather would be prohibited. (See design features 15-17.)

Approximately 3,550 feet (0.7 miles) of the existing 18-6-33.2 road would be improved with rocking. Approximately 1,880 feet (0.4 miles) of the existing privately controlled 18-6-27.3 road would remain dirt surfaced but would require renovation (grading and brushing). The existing 18-6-33.1 road would remain dirt surfaced but would require renovation (felling of some trees, brushing, and grading) along approximately 1,620 feet of road before use for yarding purposes.

The 18-6-27.3 extension road would be barricaded (tank trapped) and waterbarred west of the section line common to Sections 27 and 28 of T18S R6W. The 18-6-33 road would be gated just above its junction with the 19-6-9.1 road (B-line road). The barricading of the 27.3 extension would reduce access to approximately 0.3 miles of existing road on private lands. The gating of the 18-6-33 road would reduce access to approximately 1.4 miles of existing road on private lands and approximately 2.6 miles of existing road on BLM lands.

PROJECT DESIGN FEATURES OF THE PROPOSED ACTION

The following project design features would be implemented in conjunction with the proposed action. Project design features are operating procedures normally used to avoid or reduce environmental impacts as developed by the interdisciplinary team.

DESIGN FEATURES

Noxious Weeds and Non-natives

1. In order to slow the spread of noxious weeds, all yarding and road construction equipment would be cleaned prior to its arrival on Bureau of Land Management land. In the unlikely event roadside seeding does occur, annual and perennial rye mixtures with strict guidelines on seed purity (no crop or noxious weed content) would be used.

Riparian Reserves

2. Thinning within the Riparian Reserve was prescribed to meet the long term objectives of the Aquatic Conservation Strategy and develop large trees within the reserve more quickly than would develop naturally. Approximately 128 acres of Riparian Reserve would be thinned. Cable yarding with one end suspension would be required when yarding within Riparian Reserves. Directional felling away from streams and no yarding of logs across streams would be required to provide for streambank stability and water quality.

3. Variable width no-treatment stream buffers (minimum of 50 feet each side of the steam) would be provided to maintain existing water quality and to meet ACS objectives to all streams within the project area.

Green Tree Retention, Snags, and Coarse Woody Debris

4. Within the approximate first 50 feet above the no-treatment stream buffers, trees would be cut and left as down woody debris as follows: approximately 5 trees per acre above the no- treat stream buffers along streams 1, 2, and streams 5 through 14; and approximately 7-8 trees per acre above the no-treat stream buffers along streams 16, 17 and 19. These trees would be felled away from the no-treat stream buffers.

5. For the purpose of long term productivity and maintenance of biological diversity, retain all down material of advanced decay (Decay Class 3, 4 or 5) for coarse woody debris (CWD).

6. To provide habitat for cavity dependent wildlife and to protect the future source of down logs, snags not posing a safety hazard would be reserved. Directional felling and yarding would be utilized to protect residual green trees and snags consistent with State safety practices. Snags felled as danger trees would be retained as CWD.
7. All Pacific yew, western redcedar, and hardwoods would be retained in the thinning to maintain diversity.

8. All plus trees (genetically select trees) would be reserved. Tree numbers are 1689, 1690, 1691, 1692, 1693, 1694, 1793, 1794, 1795, 1796, 1797 and 1798.

Yarding
9. Harvest activities would not occur during sap flow season (April 15- June 15) to limit bark / cambium damage to reserve trees.

10. One end suspension of logs would be required during cable yarding and intermediate supports would be required where necessary to attain the required suspension. A cable system capable of lateral yarding 75 feet would be utilized. Yarding corridors would not exceed 12 feet in width.

11. During yarding, log lengths would be limited to a maximum of 40 feet in the thinning areas to protect residual trees during yarding.

12. Yarding would be done from new constructed temporary spurs, improved existing road grades, and renovated existing road grades with cable or tractor equipment. All yarding would be to designated or approved landings. No equipment would be allowed off roads during wet weather or high soil moisture conditions. No equipment would be allowed off roads and landing size and locations would be kept to a minimum within the Riparian Reserves.

13. Tractor Yarding - Tractor skid trails would be limited to slopes less than 35 percent. The tractor yarding would occur during periods of low soil moisture (generally less than 25% soil moisture). All tractor skid trails would be predesignated and approved by an authorized officer, and would occupy less than 10% of the tractor logged area. All yarding would be to designated or approved landings. Skid trails used in the harvesting would be water barred and subsoiled with a self-drafting winged subsoiler to maintain long term soil productivity. No tractor yarding would occur within Riparian Reserves.

14. Unmerchantable tree tops and limbs would not be yarded to the landing and should be left on site to contribute to soil productivity. After yarding, the logging slash would be cleared from within 25 feet of the main line road (19-6-9.1 B-Line road) and burned as needed.

Temporary Spur Construction
15. The road system would include new construction of temporary spurs, totaling approximately 10,185 feet (2.0 miles). Approximately 475 feet of this new spur construction would occur on private lands north of the project area. All new spurs constructed would be built during the dry season to approximately a 14 ft. width and would be dirt surfaced. No new stream crossings would occur with the new spur construction. Each new spur constructed within the project area would be decommissioned by subsoiling and would not over-winter. The temporary spurs to be constructed include the following: Spur A - approximately 260 feet in length; Spur B - approximately 785 feet in length; Spur C - approximately 505 feet in length of which 245 feet is on private; Spur D - approximately 310 feet in length; Spur E - approximately 1,810 feet in length; Spur F - approximately 1,915 feet in length of which 230 feet is on private; Spur G - approximately 1,545 feet in length; and Spur H - approximately 3,055 feet in length.

Road Improvement and Road Renovation of Existing Road
16. Approximately 3,550 feet (0.7 miles) of the existing 18-6-33.2 road would be improved with rocking.

Approximately 1,880 feet (0.4 miles) of the existing privately controlled 18-6-27.3 road would remain dirt surfaced but would require renovation (grading and brushing). The existing 18-6-33.1 road would remain dirt surfaced but would require renovation (felling of some trees, brushing, and grading) along approximately 1,620 feet (0.3 mile) of road before use for yarding purposes.

Gates and Barricades

17. The 18-6-27.3 extension road would be barricaded (tank trapped) and waterbarred west of the section line common to Sections 27 and 28 of T18S R6W. The 18-6-33 road would be gated just above its junction with the 19-6-9.1 road (B-line road). The barricading of the 27.3 extension would reduce access to approximately 0.3 miles of existing road on private lands. The gating of the 18-6-33 road would reduce access to approximately 1.4 miles of existing road on private lands and approximately 2.6 miles of existing road on BLM lands.

Wetlands

18. A riparian associated wetland (headwater of stream 8 shown on EA map) would be excluded (reserved) from the treatment area and buffered to protect the habitat associated with it. No yarding or use of equipment across this wetland would occur.

Survey and Manage Reserves - Mollusk

19. Reserves would be placed around the following mollusk locations: *Megomphix* hemphilli, - 32 sites (each approximately 0.1 - 0.3 acre reserve); *Prophysaon coeruleum* - 7 sites (each approximately 0.2 acre - 0.4 acre reserve) and, *Prophysaon dubium* - 3 sites (each approximately a 0.2 acre reserve)

Survey and Manage and Protection Buffer Species Reserves - Botanical

20. Survey and Manage and Protection Buffer botanical reserves would be placed around the following sites within the treatment area to reduce disturbance and edge effects. *Ulota meglospora* - 4 sites (each approximately 0.06 acre reserve); *Sarcosoma mexicana*,- 1 site (approximately 0.5 acre reserve); *Helvella compressa*- 1 site (approximately 0.75 acre reserve)

B. ALTERNATIVE 2

This alternative would be similar to Alternative 1, except the density management and down woody debris creation in the Riparian Reserve would not occur. Alternatives 2 would require some yarding corridors through Riparian Reserves north of the 18-6-33.1 road with downhill yarding of logs to landings on the existing 18-6-33.1 road within Riparian Reserve. The use of this road for yarding is necessary to access thinning within the upland. Cable yarding with one-end suspension would be required when yarding through Riparian Reserves.

Survey and Manage and Protection Buffer species requirements (Design features 19 and 20) would vary by Alternative and are addressed in *Section IV, Affected Environment* of the EA. All other project design features would be similar to those for the Proposed Action, Alternative 1. Both Alternative 1 and 2 would require the same amount of temporary spur construction, road improvement and road renovation.

C. ALTERNATIVE 3 (NO ACTION)

All timber harvest activities would be deferred, and no management activities described under Alternatives 1, and B would occur at this time.

III. ISSUES NOT ANALYZED

No site specific surveys were completed for any of the 32 Component 2 or Protection Buffer species listed in the Schedule Change EA. One individual of *Sarcosoma mexicana* was found, incidental to other surveys, and appropriate management actions to protect this site would be implemented under all alternatives. However, it is possible that additional individuals may reside in the project area. The issue of how the Proposed Action and alternatives would impact potential locations of this Protection Buffer species was not analyzed because impacts are not expected to exceed those described in the Schedule Change EA.

IV. AFFECTED ENVIRONMENT

This section will describe key components of the existing environment. The plants and animals in the project area do not differ significantly from those discussed in the *Eugene District Proposed Resource Management Plan/Environmental Impact Statement* (*RMP EIS, 1994*) (*Chapter 3*).

The Wolf Creek watershed is located in Lane County, southwest of the city of Eugene. The watershed lies at the eastern headwaters of the Siuslaw River Basin. The Wolf Creek watershed contains approximately 37,891 acres. The pattern of the current landscape in the Wolf Creek Watershed is largely influenced by the checkerboard ownership pattern. BLM manages approximately 16,688 acres or 44% of the watershed; Forest Industry Companies manage 49.8%; State of Oregon manages 2.4%, other private owners, 3.7%. *(Wolf Creek Watershed Analysis, February 1995)*. Several unnamed tributaries to Swamp Creek are within the project area. These streams would be protected, consistent with the *Eugene District ROD/RMP* and in accordance with the Aquatic Conservation Strategy.

VEGETATION

BLM administered lands within the watershed are comprised of the following approximate forested acres and percentages by vegetation class *(Based on Forest Operations Inventory (FOI) stand data 1998):*

= 0 year age class	132 acres	0.8%
= 10 year age class	1,900 acres	11.8%
= 20 year age class	2,021 acres	12.6%
= 30 year age class	1,703 acres	10.6%
= 40 year age class	2,267 acres	14.1%
= 50 year age class	705 acres	4.4%
= 60 year age class	2,282 acres	14.2%
= 70 year age class	275 acres	1.7%
= 80 year age class	563 acres	3.5%
= 90 year age class	87 acres	0.5%
= 100 year age class	126 acres	0.8%
= 110 year age class	12 acres	0.1%
= 150 year age class	31 acres	0.2%
= 170 year age class	190 acres	1.2%
= 180 year age class	262 acres	1.6%
= 200 year age class	3,507acres	21.8%

Approximately 30 percent of the Federal (BLM) forested acres within the watershed are currently in a late-successional ($80 years of age) condition of which nearly all are in reserves. *((Based on Forest Operations Inventory (FOI) stand data 1998)*

Project Area Description

The project area is within the Matrix (LUA) and is a predominantly dense Douglas-fir with an approximate birthdate of 1952 - 1959 (40 - 47 years old). There are very few larger residual trees present. Minor components of the stand include western hemlock, western redcedar, and hardwoods. Some areas of the stand include dense young patches of western hemlock. Mistletoe infection occurs on hemlock throughout the project area. There is a fair amount of small to medium (5-10 inch) down woody debris throughout the project area. Most CWD is in decay class IV or greater. There are very few snags across the entire section. Tall shrub and herb cover is generally light throughout the project area except in canopy openings due to deep shade caused by the dense young tree canopy. Broadleaf overstory trees are scant with only a few big leaf maple and chinkapin. Herb, bryophyte and lichen diversity is generally low due to dense shade and little CWD and residual trees in some areas. The thick duff layer in places may provide good fungal habitat

Most of the project area west of Swamp Creek and the B-Line Mainline Road (19-6-9.1 road) consists of gentle east - facing slopes. The predominant plant community in this area consists of Douglas-fir / salal-Oregon grape / sword fern with areas of ocean spray, vine maple and hazelnut. Six distinct drainages with perennial flow are present in this western portion of the project area. One wetland (~50' by 100' boggy area) is located at the upper headwaters of one of these drainages (Stream 8 on the Project EA map). This wetland and surrounding area vegetation includes hemlock, western redcedar, red alder, spirea, red-osier dogwood, willow, salal, deer fern, slough sedge, skunk cabbage, Labrador tea, and *Sphagnum* moss. The Labrador tea/sphagnum moss plant community is very unusual so far inland from the Pacific coastline and is the only such site currently known for the Coast Range Resource Area. A distinct ridge running north/south near the western border of the section supports a drier plant community including more chinkapin in the

overstory, and thick salal cover in places with a more open character in general. The north-west portion of the project area is characterized by steep (~80%) slopes and headwall areas supporting a thick, young Douglas-fir, hemlock and big leaf maple overstory with a dense sword fern-salal understory.

The project area east of Swamp Creek and the B-Line Mainline Road (19-6-9.1 road) has moderate south and west facing slopes. The predominant plant community in this area is Douglas-fir/vine maple-salal/sword fern with areas of Oregon grape, twinflower and trailing snowberry. Numbers of hazelnut and oceanspray increase upslope, while vine maple increases downslope in this area of the stand. Two low volume perennial streams on the south slope of this area support a rather narrow strip of riparian associated species (lady fern, deer fern, osoberry, etc.). A 3rd perennial stream is located on the west slope. These three streams flow into Swamp Creek which has a flood plain and associated riparian plant community varying in width from 50' to 150'. The dominant overstory tree was red alder with a thick tall shrub layer (mostly vine maple, some willow and spirea) and a rich herbaceous layer (lady fern, *Carex* spp., wild ginger, false lily-of-the-valley, skunk cabbage, twisted stalk, foam flower).

BOTANICAL RESOURCES

Special Status and Survey and Manage Plant Species

All vascular surveys were conducted and completed during the spring and summer of 1998. No federally listed threatened or endangered plant species were located within the project area of all alternatives. Included in the list of plants surveyed for were Survey and Manage Component 2 plant species. No sensitive vascular plant species were found. All botanical surveys have been completed.

Surveys for *Ulota megalospora*, a Protection Buffer moss species, were conducted during the same time frame as the above surveys according to survey protocols established by the Eugene District Botany Work Group. Protocols were developed using information from *Appendix J2 of the Final Supplemental Environmental Impact Statement on Management of Habitat for Late- Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl* (*Appendix J2 of the FSEIS*) and local expertise. *Ulota megalospora* was found at 6 sites within the survey area.

One site of *Sarcosoma mexicana,* a Survey and Manage Component 3 and Protection Buffer fungus species was found incidental to other surveys. Northwest Forest Plan Standards and Guidelines for Protection Buffer species require surveys prior to ground-disturbing activities. However, consistent with the Plan Maintenance Documentation referenced earlier, site specific surveys for *Sarcosoma mexicana* were not conducted in the proposed harvest units.

Helvella compressa, a Survey and Manage Component 1 and 3 forest floor fungi, was also found at two sites within the survey area incidental to other surveys.

The following is a summary of species found by alternative. Included is the proposed reserves for species sites to minimize soil disturbance and microclimate effects from each alternative.

Alternative 1- 9 sites - (6 sites within the treatment area):

= *Ulota meglospora*, a Protection Buffer moss was found at 4 sites within the Proposed Action treatment area. These sites would each receive approximately a 0.06 acre (approx. 30 ft. radius) reserve buffer. An additional 2 sites were located outside the treatment area in reserves.

= *Sarcosoma mexicana*, a Protection Buffer and Survey and Manage Component 3 fungi, was found at one site within the Proposed Action treatment area and would receive approximately a 0.55 acre reserve area (approx. 87 ft. radius).

= *Helvella compressa*, a Survey and Manage Component 1 and 3 forest floor fungi, was found at one site within the Proposed Action, treatment area and would receive approximately a 0.75 acre reserve area (approx.102' radius) to protect the site from immediate disturbance to the duff layer. An additional site was located outside the treatment area in the Riparian Reserve.

Alternative 2 - 9 sites (4 sites in the upland treatment area):

= *Ulota meglospora*, a Protection Buffer moss was found at 3 sites within the Alternative 2 treatment area. These sites would each receive approximately a 0.06 acre (approx. 30 ft. radius) reserve buffer. An additional 2 sites were located outside the treatment area in reserves.

= *Sarcosoma mexicana* - No sites were located within the Alternative 2 treatment area. (One site was located within the untreated Riparian Reserve with this alternative.)

= *Helvella compressa* - Same as Alternative 1

Noxious Weeds and Non-native Plant Species

Concentrations of Canada and bull thistle, Scot's broom, St. John's wort, and tansy ragwort were all located on or near the B-Line Mainline Road (19-6-9.1 road) which crosses through the project area. The Scot's broom along this road was pulled during botanical surveys. The 18-6-33.1 road supports a somewhat weedy plant community (Himalayan blackberry, foxglove, St John's wort, etc) that appears to be confined to the road.

SOILS

The soils in the proposed project area are classified as Peavine, Bohannon, and Cumley soil series. The Peavine series consist of moderately deep, well drained, red clayey soils and are predominately found on gentle to moderate slopes. The Peavine soils are members of the clayey, mixed, mesic family of *Typic Haplohumults.* The Bohannon series consists of moderately deep, well drained, gravelly or cobbly loam soils and are normally found on gentle to very steep mountainous slopes. The Bohannon soils are members of the fine-loamy, mixed, mesic family of *Typic Haplumbrepts.* The Cumley series consists of deep, moderately well drained, clayey soils and are predominantly found on gently to moderately sloping mountain footslopes at elevations of 800 to 2,000 feet. The Cumley soils are members of the clayey, mixed, mesic family of *Typic Haplohumults.* There are no acres withdrawn for non-suitability for timber production in the proposed treatment area.

AQUATIC AND RIPARIAN RESOURCES AND FISHERIES

Swamp Creek (Stream 20 on the EA map) contains primarily rearing habitat and relatively few spawning areas for cutthroat trout, coho salmon, steelhead and sculpin. Swamp Creek and its tributaries at and near the project area include glides, pools, riffles and some rapids. There are high amounts of silt and sand, with less bedrock, gravel and rubble. Moderate amounts of logs and wood debris provide stream structure. Cutthroat and sculpin are within some project area tributaries, and coho salmon use Swamp Creek within the project area.

Cutthroat and sculpin are in the main and secondary tributaries (Streams 15 and 18 on the EA map) from the east near the 18-6-33.1 road. This main tributary contains pools, glides, and riffles. Substrates include high silt, sand and low gravel. Moderate amounts of logs and wood debris provide cover. The secondary tributary contains riffles and pools in its lower reach and its channel includes sand, silt, and gravel. High amounts of wood debris and logs are in this stream.

Cutthroat have been observed in the lower reach of a west tributary of Swamp Creek (Stream 12 on the EA map). This tributary contains habitat suitable for fish downstream from a falls at a fork in the stream estimated about 500 feet upstream from the B-line (19-6-9.1) road. Habitat types include riffles, rapids, and pools in the lower part of this tributary. Stream substrates include sand, silt, gravel, rubble, and cobble. Moderate amounts of logs and wood debris are available in this tributary.

Sculpin have been observed in a tributary from the west near the north line of Section 33 (Stream 6 on the EA map). This tributary contains fish habitat below the B-line road which has a culvert with a very high drop at its outfall. Habitat types include riffles, pools, and a low falls in the lower part of the stream. Channel substrates include silt, sand and gravel. Moderate amounts of logs and wood debris provide cover.

Small riparian headwater tributaries (Streams 1, 2, 3, and 4 on the EA project map) flow west from the project area. These streams have no potential fish habitat due to their size and location high in the drainage. Cutthroat, coho, and steelhead spawn and rear downstream from these upper headwater tributaries in the Eames Creek drainage less than 1 mile west of the project area.

WILDLIFE

Threatened and Endangered species

There are no activity centers for any terrestrial species listed or proposed under the Endangered Species Act within the project area. The proposed project area provides dispersal habitat for the northern spotted owl. The proposed project area is within two known northern spotted owl 1.5 mile provincial home ranges.

Special Status Species

No sensitive amphibians were located during general wildlife surveys. No surveys specifically targeted for bats were conducted, however within the project area there were limited large snags that could provide refugia for bat species.

Survey and Manage Species- Field surveys for the red tree vole have not been conducted because the survey protocol has not been finalized. However, the Wolf Creek Watershed met the minimum red tree vole threshold habitat interim guidance requirements (potential habitat sufficient for dispersal), therefore no site specific surveys are needed. (*BLM-Instruction Memorandum No. OR-97-009*) *Instruction Memorandum No. OR-98-105* extended the interim guidance through FY99 or until superseded by revised direction.

Some Survey and Manage and Protection Buffer species have not had survey protocol or management recommendations completed. District Working Groups (wildlife specialists) have developed interim management guidelines utilizing *Appendix J2 of the FSEIS* and local expertise where needed to implement the survey and manage standard and guidelines.

Protocol surveys were conducted and completed for Strategy-2-Mollusk Species during the fall of 1997 and the spring of 1998. Three mollusk species (66 sites) were found within the survey area for all alternatives; *Megomphix hemphilli* (a land snail) was found alone at 55 sites; *Prophysaon coeruleum* (a land slug) was found alone at 6 sites; *Prophysaon coeruleum* and *Prophysaon dubium* (a land slug) were found together at 2 sites; and *Prophysaon coeruleum* and *Megomphix hemphilli* were found together at 2 sites, and *Prophysaon dubium* and *Megomphix hemphilli* were found together at 1 site.

Alternative 1- 66 sites - (65 sites within the treatment area of which 37 would receive reserve buffers. One site would be outside the treatment boundary in Riparian Reserve):

= *Megomphix hemphilli*, a land snail, was found at a total of 57 sites within the Alternative 1 treatment area of which 32 sites would receive 0.1 to 0.3 acre reserve buffers. One additional site is outside the treatment boundary within the Riparian Reserve.

= *Prophysaon coeruleum*, a land slug, was found at a total of 10 sites within the Alternative 1 treatment area of which 7 sites would receive 0.2 acre to 0.4 acre reserve buffers.

= *Prophysaon dubium* ,a land slug, was found at a total of 3 sites within the Alternative 1 treatment area. Each of these sites would receive approximately a 0.2 acre reserve buffer.

Alternative 2- 66 sites- (45 sites are within the treatment area of which 23 sites would receive reserve buffers. 21 sites would be outside the treatment boundary in the Riparian Reserve.)

= *Megomphix hemphilli* - a land snail, was found at a total of 43 sites within the treatment area of which 21 sites would receive 0.1 to 0.3 acre reserve buffers. 15 sites would be outside the treatment boundary in the Riparian Reserve

= *Prophysaon coeruleum*, a land slug, was found at four sites within the Alternative 2 treatment area. These 4 sites would each receive 0.2 acre reserve buffers. 6 sites would be outside the treatment area in Riparian Reserves.

= *Prophysaon dubium* -a land slug, was found at 2 sites within the Alternative 2 treatment area. These 2 sites would each receive approximately a 0.2 acre reserve buffer. One site would be outside the treatment area in Riparian Reserves.

Big game
Black-tailed deer and elk occur in the project area. The proposed project area is being used by deer and elk for forage, hiding cover and to a minor extent thermal cover. Adjacent clearcuts would be used for foraging by both deer and elk. There is a lack of large standing or down trees that could provide denning sites for black bears. However, the project area and adjacent lands could be used by transitory or foraging bears known to exist in the area.

Neotropical migrants
Species preferring mid-successional coniferous stands and edge habitat such as the olive-sided flycatcher would be expected to occur in the project area.

Other Wildlife - There are no known raptor nests or heron rookeries in the proposed project area or in close vicinity.

CULTURAL RESOURCES
A cultural resource inventory of the proposed area has not been completed. Past pre-project inventories in the lands administered by the Bureau of Land Management within the Coast Range Physiographic Province have not resulted in the discovery of historic properties, therefore no cultural resources are expected to be affected. The guidelines of the protocol agreement (Protocol Appendix D) between the Bureau of Land Management and the Oregon State Historic Preservation Officer (1998) makes the conclusion "that the chances of finding important historic properties in the area are so minimal such that further cultural resource survey prior to project implementation does not justify the continued expenditure of federal funds in the effort". The protocol agreement does set forth procedures covering post-project cultural resource surveys which would be implemented.

RECREATION AND VISUAL RESOURCES
The project area is classified as Visual Resource Management Class IV, which allows for moderate levels of change to the characteristic landscape. Management activities may dominate the view and be the major focus of viewer attention. Timber management activities are recognized as consistent with the objectives for Class IV visual resources. *(Eugene District ROD/RMP, June 1995, page 75-78)*.

The project area is in BLM administered lands used for dispersed recreation activities, such as hunting and driving for pleasure. Timber management activities are recognized as consistent with dispersed recreation activities.

SNAGS / DOWN WOODY DEBRIS / FUELS
The pre-harvest fuel loading in the proposed thinning is approximately 10-11 tons per acre (heavier in the blowdown patches). There are few natural snags greater than 15" DBH within the proposed project areas. Most snags observed are small in diameter (<15" DBH) and seem to be a product of suppression mortality. There are several areas with blowdown logs which include some larger down logs of decay Class 1 and 2, however, there are few large diameter down logs for the project areas as a whole . Most CWD seen was in decay class IV or greater. Smaller diameter down woody material (5-10) inches is present.

V. DIRECT AND INDIRECT EFFECTS
This section will describe the consequences of implementing the proposed action and the anticipated consequences of the no action and alternatives.

A. UNAFFECTED RESOURCES

The following resources are either not present or would not be affected by the proposed action or any of the alternatives: Areas of Critical Environmental Concern, prime or unique farm lands, floodplains, Native American religious concerns, solid or hazardous wastes, Wild and Scenic Rivers, Wilderness, and low income or minority populations.

CULTURAL RESOURCES - are not expected to be affected by the proposed action or any of the alternatives.

RECREATION AND VISUAL RESOURCES - Visual resources would not be affected by the proposed action or any of the alternatives. Both Alternatives 1 and 2 would cause a decrease in approximately 2.6 miles of road access on BLM lands for potential dispersed recreation. These resources will not be addressed further in the analysis.

AIR QUALITY - Burning activities, if required for roadside fire hazard reduction (design feature 14), would be consistent with Oregon Smoke Management Regulations. The burning would be of very short duration and would have no local short or long-term impacts on air quality. All burning would meet the State Implementation Plan for smoke management and the National Ambient Air Quality Standards set forth in the Clean Air Act. This resource will not be addressed further in the analysis. The proposed project area is approximately 5 miles southwest of the Willamette Designated Area (DA).

B. DIRECT AND INDIRECT EFFECTS OF ALTERNATIVE 1- PROPOSED ACTION

VEGETATION

The proposed action (commercial thinning) would immediately increase the amount of light reaching the forest floor. This would increase the growth of understory vegetation in the short term. Most of the remaining trees would be the larger dominant and codominant conifer species comprised mostly of Douglas-fir. The thinning would decrease competition between trees maintaining or increasing individual tree growth and tree vigor with enlargement of the existing crowns (canopy closure) over time. Forest floor vegetation would again decrease with the reduction of light reaching the forest floor as the canopy closure increases with time. Vegetative diversity would be maintained by reserving hardwood trees and other coniferous species. Herbaceous, fungal, and bryophyte diversity would be maintained by keeping the disturbance of the down woody debris to a minimum. Current vegetative and structural diversity would be maintained by reserving legacy trees and minor species.

Ground disturbance from cable yarding, ground based (tractor) yarding, and spur construction would temporarily set back vegetation within the yarding corridors, skid trails and temporary spur prisms. Cable yarding would have a lesser impact than both the spur construction or tractor yarding on the vegetation within the understory.

BOTANICAL RESOURCES

The proposed action would have no effect upon federally listed threatened or endangered plants. Survey and Manage Component 1 and 3, and Protection Buffer species (9 sites) are known to occur within the survey area and six of these sites occur within the treatment area. These six sites within the treatment area would receive reserve buffers as described in *Section IV, Affected Environment* of the EA.

The proposed action would result in removal of much of the overstory with an associated change in microclimate for plants and fungi; increasing light and wind intensities and decreasing soil moisture and relative humidities. Road building and yarding would result in soil disturbance and would increase the likelihood of non-native and potentially noxious species entering and/or increasing in the unit. Ground disturbance from road construction and ground based (tractor) yarding would temporarily set back native herbaceous communities and impacts underground fungal resources negatively. Design features addressing road construction, cleaning of equipment, yarding methods, and site preparation methods along with reserves are incorporated within the proposed action and alternatives to lessen or alleviate these effects.

Little is known about the effects of harvest and regeneration on non-vascular plant components. The removal of overstory trees would have short term impacts on those species that form complex mychorizal or epiphytic relationships with overstory trees.

The proposed action, Alternative 1, would have the greatest potential effect of all the alternatives on Survey and Manage and Protection Buffer Species due to the greater area harvested and the greater number of Survey and Manage and Protection Buffer Specie sites located within the treatment area (Alternative 1 contains 6 sites within the treatment area to be buffered; Alternative 2 contains 4 sites within the treatment area to be buffered; and Alternative 3 is the no-action alternative). The reserves for the Survey and Manage and Protection Buffer Species within the treatment area would allow for a continuing legacy of these species in the B-Happy stand with this alternative. See the paragraph "Reserves" for reserve or buffer requirements for these species. These reserves are also described in greater detail under botanical resources within *Section IV Affected Environment* of the EA.

These Survey and Manage and Protection Buffer reserves along with the Riparian Reserves would ensure adequate protection under Alternatives 1 for individual Protection Buffer and Survey and Manage sites by; (1) maintaining a viable population at these sites by protecting known sites (with associated spore banks), (2) protecting habitat at known sites by maintaining the duff/litter layer in the case of terrestrial species and the substrate (tree trunk, branches etc.) for *Ulota*, and by providing some minimal microclimate buffering, and (3) maintaining the current known range of the species.

SOILS
The proposed action and associated management practices would not cause soil compaction capable of impairing overall stand growth, long term productivity or the hydrologic behavior of the treatment area. Sufficient litter, logging debris and down logs would be retained to maintain soil organic material, soil organisms and nutrient levels. There are no slope stability concerns within the treatment area. Designating skid trails, restricting tractor yarding to dry seasons and gentler slopes (less than 35% slope), and subsoiling skid trails would keep overall growth loss effects to 1 percent or less of any treated unit area compacted (*Eugene District ROD/RMP, June 1995*).

AQUATIC AND RIPARIAN RESOURCES / FISHERIES.
The riparian treatment would promote development of large conifers, development of multi-layered canopies, and diversity of species composition within the Riparian Reserve as described relative to vegetation and wildlife. The proposed density treatment within the Riparian Reserves would accelerate tree growth to provide future sources of large wood for stream channels (providing more structure, cover, pools, and retention of gravel and small wood debris). The no-treatment stream buffers adjacent to the streams would protect streambanks, provide shade, and would contribute to maintaining current water quality and conditions of riparian and aquatic functions. This would include tempering of stream/riparian microclimates from edge effects, retaining slope stability and the associated protection from stream sedimentation, and maintaining litter inputs to stream/riparian areas. Maintenance of riparian vegetation within the no-treatment buffer would provide protection of fish habitat. There would be no measurable effects to the aquatic systems in this watershed due to the proposed action.

<u>Stream Flows</u>
There would be no measurable increase in low flows since the residual trees would use the increase in available water. Any changes in flows would be small relative to the natural range of flows that occur due to storm events.

<u>Rain on Snow Events and Peak Flows</u>
The proposed project area is not typically considered a rain on snow zone. Consequently, there would be no expected increases in peak flows due to rain on snow events. In the event that there is a rain on snow event in the project area, the residual trees would lessen the effects from increasing high flows.

In-Stream Structure and Stream Function

The density management within Riparian Reserve would accelerate the development of large conifers for future large wood contribution into the stream channels. This in-stream structure would provide for improved water quality by trapping sediments, stabilizing stream channels, and slowing high flows. This would improve fish habitat, increase the opportunity for exchange of ground water and stream water, and would maintain normal flooding of the floodplain. Future riparian restoration or silvicultural treatments may be necessary to accelerate long-term riparian recovery.

Roads and Stream Sediment

There would be approximately 2 miles of temporary dirt spur construction prior to harvest. There would be no new stream crossings with the new spur construction. Harvesting from these dirt spurs would occur in the same dry season in which they are built. These spurs would be decommissioned by subsoiling and would not overwinter. Approximately 0.7 miles of existing road would be improved with rocking within and near the treatment area, and approximately 0.7 miles of existing road would be renovated prior to use. Gating and barricading of existing roads at the completion of harvest would result in approximately 4.3 miles of road with limited or controlled access.

All proposed temporary spur construction, road improvement, and road renovation within the project area would not deliver flow or sediment to stream channels beyond existing conditions or impact aquatic resources. There would be no increases in the drainage density from road construction, therefore, there would be no increase in peak flows due to roads.

WILDLIFE

There would be no reduction in dispersal habitat with the proposed thinning, however, the proposed thinning would temporarily reduce the quality of this habitat. The quality of this habitat would increase until the next entry.

Pursuant to the Endangered Species Act, formal consultation was completed with the U.S. Fish and Wildlife Service (USFWS) on this proposed action. The USFWS issued its Biological Opinion on October 23, 1998, completing consultation. According to that Biological Opinion, B-Happy would "*May Affect, but is Not Likely to Adversely Affect"* the northern spotted owl due to modification of dispersal habitat within the unit. There would be approximately 80% of federal lands in a dispersal condition before and after treatment within the quarter township. This proposal would have a *"No Affect"* on the marbled murrelet and other federally listed/proposed terrestrial species.

The thinning would maintain or increase growth and vigor of the retention trees by providing additional growing space. This thinning would benefit those species that rely on larger trees, snags and down wood for habitat (i.e. pileated woodpeckers and some bat species for roosting habitat). Existing down logs, larger diameter green trees, and snags to the extent possible would be left to continue functioning in the forest. Retention of snags would provide habitat for cavity nesting.

Species preferring mid-successional coniferous stands and edge habitat such as the olive-sided flycatcher, would be expected to occupy the project area after treatment. Overall, bird species presently using this area could be expected to occupy it post harvest.

Immediately after the proposed treatment, the value of hiding and thermal cover for deer and elk would be reduced. However, forage would increase in the project area and after approximately five years, the project area would provide escape cover for these species. As the stands within the project area mature, but before the final harvest entry, the quality of hiding, and to a lesser extent, thermal cover would increase as the canopy closes and develops multiple layers.

Harvest activities and the temporary reduction in overstory canopy cover and understory vegetation cover would be expected to cause a reduction in the numbers of mollusks locally by resulting changes in site micro-climate and available refuge habitat. The project design features incorporated into the proposed action would

reduce these changes in refuge habitat and microclimate by providing non-treated reserves or buffers (Design feature 19) adjacent to the following: 32 designated locations of *Megomphix hemphilli*, 3 designated locations of *Prophysaon dubium*, and 7 locations of *Prophysaon coeruleum*; and by providing for the retention of snags, hardwoods, and down woody material (Design features 4-7). Recent surveys have begun to reveal that these mollusk species populations are larger within their range and more resilient to changes in environmental conditions than previously thought. Populations have continued their presence after recent regeneration harvest and within young harvest plantations where extreme changes in habitat and abrupt changes in microclimate have occurred. The mollusk populations are expected to continue their presence for the long term within the project area with the implementation of the proposed action and the incorporated design features.

SNAGS / DOWN WOODY DEBRIS / FUELS
Herbaceous, fungal, and bryophyte diversity would be maintained by retention of snags and existing down logs both within blowdown patches and throughout the treatment area. The increase in large down woody material in the thinning, along with the retention of existing down logs and snags, would provide a number of ecosystem functions, including habitat for many species, moisture retention, and nutrient retention and cycling. These effects would contribute to long term site productivity. Additional down woody debris would be provided with the cut-and-leave of additional trees within the project area (Design feature 4) and through natural disturbance to the retained overstory.

Fuel loading within the treatment area would increase but would be variable throughout the treatment areas due to the variable preharvest fuel bed conditions present. Post harvest fuel loading would be expected to be heavier in the lower overstory retention tree areas. (Post harvest fuel loading is expected to be in the 20 tons per acre range in the proposed treatment area). Fuels would be almost entirely ground fuels with minor amounts of scattered ladder fuels. The 25 foot slash pullback and burning of the harvest wood debris piles along the B-Line Mainline (19-6-9.1 road) where it traverses through the treatment areas would reduce the immediate roadside fuel hazards within the proposed thinning project area.

SOCIAL-ECONOMIC
The thinning would provide immediate commodities to the public. By thinning at this time, the biological window to maintain or increase vigor and volume growth of the upland stand for future commodities would be realized. The proposed action would support the Eugene District commercial thinning harvest commitment levels for Fiscal Year 1999 and timber volume would be supplied for the benefit of the economy.

C. DIRECT AND INDIRECT EFFECTS OF ALTERNATIVE NO. 2

This alternative would be similar to Alternative 1, except the density management and down woody debris creation in the Riparian Reserve would not occur. Alternatives 2 would require some yarding corridors through Riparian Reserves north of the 18-6-33.1 road with downhill yarding of logs to landings on the existing 18-6-33.1 road within Riparian Reserve. The use of this road for yarding is necessary to access thinning within the upland. Cable yarding with one-end suspension would be required when yarding through Riparian Reserves.

Survey and Manage and Protection Buffer species requirements (Design features 19 and 20) would vary by Alternative and are addressed in *Section IV, Affected Environment* of the EA. All other project design features would be similar to those for the Proposed Action, Alternative 1. Both Alternative 1 and 2 would require the same amount of temporary spur construction, road improvement and road renovation.

VEGETATION
The environmental effects to vegetation due to commercial thinning within the upland matrix would be similar to those effects described in the Proposed Action, Alternative 1. The environmental effects to vegetation within the yarding corridors north of the 18-6-33.1 road within the Riparian Reserve would be similar to those described in Alternative 1. The environmental effects to vegetation in the remainder of the Riparian Reserve using this alternative would be similar to those effects to vegetation described in the “No Action” Alternative 3.

BOTANICAL RESOURCES
The Alternative 2 action would have no effect upon federally listed threatened or endangered plants similar to Alternative 1. Survey and Manage Component 1 and 3, and Protection Buffer species known to occur within the project area as described in *Section IV, Affected Environment* of the EA would be less impacted by this alternative than Alternative 1 due to the smaller area treated and the smaller number of Survey and Manage and Protection Buffer Species sites located within the treatment area (Alternative 1 contains 6 sites within the treatment area; Alternative 2 contains 4 sites in the treatment area). Alternative 2 would have similar but less impact overall than Alternative 1 to botanical resources currently present due to less treatment area. Alternative 2 would have similar effects to the no-action Alternatives 3 relative to botanical resources occurring in the Riparian Reserve.

SOILS
In the upland treatment area and in the downhill yarding corridors north of the 18-6-33.1 road within Riparian Reserves, the Alternative 2 action and associated management practices would not cause soil compaction capable of impairing overall stand growth, long term productivity or the hydrologic behavior of the Riparian Reserve or upland treatment area. There would be no effects to soils in the remainder of the Riparian Reserve.

AQUATIC AND RIPARIAN RESOURCES / FISHERIES
Stream Flows
There would be no measurable increases in low flows since the residual trees would use the increase in available water similar to Alternative 1. There would be even a lower probability of any increases in low flows with Alternative 2 due to the greater number of residual trees in the untreated Riparian Reserve.

Rain on Snow Events and Peak Flows
The proposed project area is not typically considered a rain on snow zone. Consequently, there would be no expected increases in peak flows due to rain on snow events similar to Alternative 1. In the event that there is a rain on snow event in the project area, Alternative 2 would show less of an increase in high flows than Alternative 1 due to the greater number of residual trees within the untreated Riparian Reserve.

In-Stream Structure and Stream Function
The untreated riparian and no-treat stream buffers would protect streambanks, provide shade, and would contribute to maintaining current water quality and conditions of riparian and aquatic functions similar to the no-action, Alternative 3. The large conifers and the associated large, in-stream structure and benefits large conifers provide in the riparian would develop the same as Alternative 3 and slower than Alternative 1.

Roads and Stream Sediment
The direct and indirect effects due to roads with Alternative 2 would be the same as Alternative 1 since both alternatives would use the same road system and would require the same amount of temporary spur construction, road improvement and road renovation. All proposed temporary spur construction, road improvement, and road renovation within the project area would not deliver flow or sediment to stream channels.

WILDLIFE
The environmental effects to vegetation with Alternative 2 would have effects to wildlife similar to Alternative 1 except Alternative 2 would not modify dispersal habitat for the northern spotted owl in the Riparian Reserve. The development of late-successional habitat within the Riparian Reserve would occur slower delaying the beneficial effects of habitat for late-successional dependent species, riparian species and in-stream aquatic species similar to Alternative 3.

Harvest activities and the temporary reduction in overstory canopy cover and understory vegetation cover would be expected to cause a reduction in the numbers of mollusks locally by resulting changes in site micro-climate and available refuge habitat as described in Alternative 1. However there would be less impact on local numbers of mollusk species with this alternative due to no treatment in Riparian Reserve. The mollusk

populations are expected to continue their presence in the long term within the project area similar to Alternative 1.

= *Megomphix hemphilli* - would be less affected by this alternative (43 sites within the Alternative 2 treatment area; versus 57 sites within the Alternative 1 treatment area.)

= *Prophysaon coeruleum*, - would be less affected by this alternative (4 sites within the Alternative 2 treatment area; versus 10 sites within the Alternative 1 treatment area.)

= *Prophysaon dubium* -would be less affected by this alternative (2 sites within the Alternative 2 treatment area; versus 3 sites within the Alternative 1 treatment area.)

SNAGS / DOWN WOODY DEBRIS / FUELS
The environmental effects of the upland commercial thinning relative to snags, down woody debris, and fuels would be similar to those effects described with Alternative 1. The environmental effects of no-treatment within the Riparian Reserve relative to snags, down woody debris, and fuels would be similar to those effects described with the "no-action" Alternative 3.

SOCIAL-ECONOMIC
Alternative 2 would provide immediate commodities to the public. Alternative 2 would support the Eugene District commercial thinning harvest commitment levels for Fiscal Year 1999 at the same level as Alternative 1, however, more timber volume would be supplied for the benefit of the economy with this alternative.

D. DIRECT AND INDIRECT EFFECTS OF ALTERNATIVE 3- NO ACTION

VEGETATION
The no action alternative would have no immediate direct effects to the existing forest vegetation and would allow continued stand development. However, tree growth would slow down over time in the absence of a commercial thinning, and suppressed mortality and windthrow of the trees would increase as competition for growing space increases. Small diameter snags would continue to be recruited through this suppression mortality. Those dominant trees that are eventually released would increase in vigor and growth, however, this succession process would occur much slower over time under the uniform, dense stand conditions present. The benefit of increased tree and stand growth over time would be lost.

Within the Riparian Reserve, the long term development of mature and late-successional forests and their associated species would occur slowly through natural disturbances and forest succession over time. The development of late-successional forest structure and the associated source of large trees for future large in-stream structure would occur slower without density management as the existing trees grow, compete for growing space, slow in diameter growth, reduce live crown ratios, and begin to self-thin naturally. A persistent closed canopy would slow the growth of any understory hemlock, and red cedar regeneration and slow the development of canopy layering. The herbs, shrubs, and non-vascular plants found in the Riparian Reserves would remain undisturbed.

BOTANICAL RESOURCES
The "No Action" Alternative 3 would have no direct effect on botanical resources. The no action alternative would allow for the continuation of a mid-seral forest condition within the upland matrix with its associated botanical species until the upland stand is regeneration harvested. Within the Riparian Reserve, the long term development of mature and late-successional forests and their associated botanical species would occur slowly through natural disturbances and forest succession over time.

SOILS
The "No Action" Alternative would have no effect on soil resources.

AQUATIC AND RIPARIAN RESOURCES / FISHERIES
The untreated riparian and no-treat stream buffers would protect streambanks, provide shade, and would contribute to maintaining current water quality and conditions of riparian and aquatic functions. This would include tempering of stream and riparian microclimates from edge effects, retaining slope stability and the associated protection from stream sedimentation, and maintaining litter inputs to streams and riparian areas. These effects would contribute to the protection of water quality for fisheries and to the protection of riparian and aquatic resources. However, by not thinning the proposed treatment area within the Riparian Reserve, the development of large conifers as a source for future large snag and down wood recruitment for riparian and in-stream health would occur much slower. Large woody debris, beneficial for the functioning of streams and the riparian would take longer to develop under this scenario. (See vegetation effects above for delayed development of late-successional stand characteristics within the riparian with this alternative.)

WILDLIFE
The "no action" alternative would not modify dispersal habitat for the northern spotted owl both in the upland Matrix and Riparian Reserve. However, as described above in reference to vegetation, the development of late-successional habitat within the Riparian Reserve with the "no action" alternative would occur slower, delaying the beneficial effects of habitat for late-successional dependent species, riparian species and in-stream aquatic species. By not thinning the proposed treatment area within the upland and Riparian Reserve, tree growth and large snag and down wood recruitment would occur much slower. There would be an increase in the amount of small down wood from suppressed mortality and natural disturbances. Large woody debris, and large diameter trees and snags that provide habitat for certain species of wildlife (i.e. pileated woodpecker and some bat species for roosting habitat) would take longer to develop. (See "vegetation effects" above for delayed development of late-successional stand characteristics within the riparian with this alternative.)

Species preferring mid-successional coniferous forests and edge habitat such as the olive sided flycatcher, would be expected to continue to occupy the upland project area until the stand is regenerated. As the Riparian Reserve stand matures, species more associated with later seral stages are expected to occupy this stand. Such species include the hermit warbler. There would be no effect to mollusk species with the "no action" alternative.

SNAGS / DOWN WOODY DEBRIS / FUELS
The development of large trees for future recruitment of large snags and down wood is expected to occur slower over the long term in the upland and Riparian Reserve due to no thinning with this alternative. The contribution of down wood and the development of future large snags and down wood would be entirely dependent on natural disturbances and suppressed mortality that would occur slowly over time. Fuel loading would increase with the increase in down wood from smaller trees due to natural disturbances and suppressed mortality.

SOCIAL-ECONOMIC
Commodities provided to the public through thinning would not occur. By not thinning at this time, the biological window to maintain or increase vigor and volume growth of the upland stand for future commodities would not occur. Timber volume to benefit the economy would not be realized unless an alternative harvest area is provided. Alternative areas may have environmental effects that exceed those of this proposal.

VI. CUMULATIVE EFFECTS

A CUMULATIVE EFFECTS OF ALTERNATIVE 1- PROPOSED ACTION
This analysis incorporates the analysis of cumulative effects in the *USDA Forest Service and USDI Bureau of Land Management Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl, February 1994, (Chapter 3 & 4)* and in the *Eugene District Proposed RMP/EIS November, 1994 (Chapter 4).*

These documents analyze most cumulative effects of timber harvest and other related management activities. None of the alternatives in this proposed action would have cumulative effects on resources

beyond those effects analyzed in the above documents. The following section supplements those analyses, providing site-specific information and analysis particular to the alternatives considered here.

VEGETATION

The current vegetation pattern within the Wolf Creek watershed has been described in the existing environment The Wolf Creek watershed contains approximately 37,891 acres. Approximately 16,687 acres (44 percent) of the Wolf Creek Watershed is managed by the BLM. The pattern of the current landscape in the Wolf Creek watershed is largely influenced by the checkerboard ownership pattern. The immediate effect of implementing the proposed B-Happy Commercial Thinning would be an increase of 434 acres of second growth forests that have been thinned to maintain or increase vigor and growth for commodities, wildlife and fisheries values within the Wolf Creek Watershed.

Within the Wolf Creek Watershed, BLM has developed several timber sales since the implementation of the Northwest Forest Plan. BLM sold B-Line Density Management in 1996 and completed the Grenshaw Density Management within LSR in 1997 to promote the attainment old growth stand characteristics. In addition to these thinnings, Creat Road Thinning and Aim High Thinning were sold in 1996 within the Matrix LUA of the Wolf Creek Watershed and D-Line thinning was sold in 1997. D-Line thinning is located within the Matrix LUA of both the Wolf Creek and Wildcat Creek Watersheds. The most recent sold timber sale in the watershed has been the Upper Wolf Timber Sale sold in 1997. The Upper Wolf Timber sale included 64 acres of thinning and 67 acres of regeneration harvest within the Matrix (GFMA) land use allocation.

Future planned sales within the Wolf Creek Watershed in addition to this proposed action include the Link n' Log density management sale (approximately 136 acres) within the Matrix (Connectivity) and LSR land use allocations to be sold in FY98; the Point of Panther regeneration harvest sale (approximately 103 acres) within the Matrix (GFMA) land use allocation to be sold in FY99; the Lone Wolf commercial thinning and density management to include a treatment to reduce an infestation of Hemlock Dwarf Mistletoe (approximately 79 acres) within the Matrix to be sold in FY00; and the Panther Bottom regeneration harvest (approximately 70 acres) within the Matrix (GFMA) land use allocation to be sold in FY01.

With the implementation of the Northwest Forest Plan, there would be an increase in mature and old forest habitat within the watershed over time as the LSR and Riparian Reserves mature and develop. Approximately 94 percent of the BLM ownership within the watershed is being managed toward a late-successional condition. Approximately 41 percent of the forests in the watershed are being managed toward a late-successional condition. *(Wolf Creek Watershed Analysis, Feb. 1995)*.

Approximately 21,204 acres (56 percent) of the watershed is in private and state ownership. Intensive timber management is practiced on most of this ownership and is likely to continue.

BOTANICAL RESOURCES

The Proposed Action, Alternative 1, would have no cumulative effect upon federally listed threatened or endangered plants. Survey and Manage Component 1 and 3, and Protection Buffer species are known to occur within the project area as described in *Section IV, Affected Environment* of the EA. The Survey and Manage and Protection Buffer reserve areas within the proposed action, together with the Riparian Reserves and LSR across the watershed would maintain and contribute to the long term continued presence and viability of these Survey and Manage and Protection Buffer species populations throughout the project area and watershed. These species would be managed in accordance with the District management strategy developed for these species over time incorporating adaptive management as more information becomes known for these species.

SOILS

The proposed action and associated management practices would not cumulatively impair overall stand growth, long term productivity, or impact aquatic resources.

AQUATIC AND RIPARIAN RESOURCES / FISHERIES
The proposed action would contribute to the cumulative process of riparian recovery within the Wolf Creek Watershed over the long term. The riparian treatment would promote development of large conifers, and maintenance of species diversity within the Riparian Reserve. The remaining untreated Riparian Reserve adjacent to Swamp Creek and its tributaries would protect streambanks, provide shade, and would contribute to maintaining current water quality and conditions of riparian and aquatic functions. This would include tempering of stream and riparian microclimates from edge effects, retaining slope stability and the associated protection from stream sedimentation, and maintaining litter inputs to streams and riparian areas. These effects would contribute to the protection of water quality for fisheries and to the protection of riparian and aquatic associated resources.

WILDLIFE
In reference to the northern spotted owl, the objective of the Riparian Reserves within the Matrix is to provide connectivity or dispersal habitat between LSRs. This objective would be accomplished by maintaining and improving dispersal habitat within Riparian Reserves and thereby, in effect, maintaining a dispersal habitat condition across the landscape. There are approximately 8,059 acres of Riparian Reserve dispersed throughout the BLM ownership within the watershed and approximately 1,338 acres of Riparian Reserve dispersed throughout the Matrix (GFMA) land use allocation. *(Wolf Creek Watershed Analysis, Feb. 1995)*.

LSRs have been designed across the landscape to maintain and enhance late-successional forests as a network of habitat for late-successional forest-dependent species, including the northern spotted owl. This network of LSRs, along with the Riparian Reserves, would enhance a sustainable and intermixing population of owls. With the implementation of the Northwest Forest Plan, there would be an increase in mature and old forest habitat within the watershed over time as stands within the LSRs and Riparian Reserves mature and develop. No impacts are expected to occur to the marbled murrelet or its habitat as the proposed treatment area does not currently provide suitable murrelet habitat.

The Survey and Manage mollusk reserve areas within the proposed action , together with the Riparian Reserves and LSR across the watershed would maintain and contribute to the long term continued presence and viability of these mollusk species populations throughout the project area and watershed. These species would be managed in accordance with the District management strategy developed for these species over time incorporating adaptive management as more information becomes known for these species.

SNAGS / DOWN WOODY DEBRIS / FUELS
The proposed action would contribute to the development of large trees to provide future large snags and down wood in the long term. The increase in large down woody material within the watershed, along with the retention of existing down logs and snags, would provide a number of ecosystem functions, including habitat for many species, moisture retention, and nutrient retention and cycling. These effects would contribute to the cumulative long term productivity of the watershed.

SOCIAL-ECONOMIC
This proposed action would have a cumulative impact of providing more commodities (i.e. lumber) to the public over time while maintaining or increasing the vigor and volume growth of the stand through time. Timber volume to benefit the economy would be higher.

B. CUMULATIVE EFFECTS OF ALTERNATIVE NO. 2 - (This alternative would be similar to Alternative 1, except the Riparian Reserve would not be treated)

The cumulative effects within the upland matrix (outside the Riparian Reserve) would be similar to the cumulative effects described in the Proposed Action, Alternative 1. The cumulative effects of “no treatment” within the Riparian Reserve using this alternative would be similar to the cumulative effects described in the “No Action” Alternative 3.

C. CUMULATIVE EFFECTS OF ALTERNATIVE 3- NO ACTION

VEGETATION
Over the long term, tree growth would slow down in the absence of a commercial thinning, and suppressed mortality and windthrow of the trees would increase. Small diameter snags would continue to be recruited through suppression mortality. Those dominant trees that are eventually released by means of suppressed mortality would increase in vigor and growth, however, this succession process would occur much slower over time under the uniform, dense stand conditions present. Cumulatively there would more acres of dense forest within the watershed subject to increased suppressed mortality and slower growth.

BOTANICAL RESOURCES
The No-action, Alternative 3 would have no cumulative effect upon federally listed threatened or endangered plants. Survey and Manage Component 1 and 3 species and Protection Buffer species are known to occur within the project area as described in *Section IV, Affected Environment* of the EA. The No-action, Alternative 3, together with the Riparian Reserves and LSR across the watershed would maintain and contribute to the long term continued presence and viability of these Survey and Manage and Protection Buffer species throughout the project area and watershed. These species would be managed in accordance with the District management strategy developed for these species over time incorporating adaptive management as more information becomes known for these species.

SOILS
The “No Action” Alternative would have no cumulative effect on soil resources in the upland and treatment area.

AQUATIC AND RIPARIAN RESOURCES / FISHERIES
The forest succession process and riparian recovery (i.e. water quality, fish habitat, habitat for wildlife species dependent upon large snags and down wood) would occur slower over time due to uniform, dense stand conditions present. Riparian recovery of the watershed would occur slower within the Wolf Creek Watershed over the long term.

WILDLIFE
The “No Action” Alternative 3 would not modify dispersal habitat for the northern spotted owl both in the upland Matrix and Riparian Reserve. The forested area would continue to contribute cumulatively to dispersal habitat within the watershed and across the landscape until such time the upland GFMA receives a regeneration harvest. Within the Riparian Reserve, the long term development of mature and late-successional forests and their associated benefits to late-successional dependent species would occur slowly through natural disturbances and forest succession over time contributing to a cumulative increase in late-successional forest habitat and connectivity of late-successional forest habitat across the watershed. Wildlife species associated with the current habitat conditions would persist under the present stand conditions but would see changes dependent upon future stand characteristics, disturbances, and type of management over time as described in the direct and indirect affects.

SNAGS / DOWN WOODY DEBRIS / FUELS
The development of large trees for the future contribution of down wood and the development of future large snags would be dependent on natural disturbances and suppressed mortality that would occur slowly over time.

SOCIAL-ECONOMIC
The "No Action" Alternative 3 would have a cumulative effect of providing less commodities (i.e. lumber) to the public over time. Vigor and growth of the stand through time would be reduced. This would result in an decrease of commodities over time. Timber volume to benefit the economy would be lower.

VII. MITIGATION MEASURES
Surveys for the 32 species listed in the Schedule Change EA will begin if technical feasibility problems can be solved. If it is determined by species experts that survey feasibility issues have been resolved throughout the

suspected range of any of the 32 species, and if a letter of direction is received prior to issuance of a Decision Record, surveys and appropriate management actions would be implemented.

VII. EFFECTS ON AQUATIC CONSERVATION STRATEGY (ACS) OBJECTIVES

ACS OBJECTIVE 1

Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted.

The upper part of Wolf Creek 5th field watershed has been actively managed for timber since European settlement in the 2nd half of the 19th century. Prior to that it was used by Native Americans. Fires, natural and human - caused, burned the area at intervals, leaving a mosaic of forest of variable seral stages. There is currently active harvesting on private lands. Lower Swamp Creek, Panther Creek, and Wolf Creek have agricultural and residential uses, the only part of the Fifth Field Watershed where such uses are present. The majority of forest lands are in younger age classes. Intermingled federal lands managed under the Forest Plan / RMP are similarly in a younger age class with only limited mature forests. The Federal forests provide both forest and aquatic habitat, and function as connectivity between the Coast Range and lands bordering the Willamette Valley, and between lands to the north and south.

All alternatives addressed within the EA are consistent with the management guidelines of the Eugene District RMP concerning riparian connectivity, the 15% retention requirement of late-successional forests within the watershed, and terrestrial habitat requirements.

All alternatives leave the currently existing late-successional habitat (i.e. $ 80 years) within the Wolf Creek Watershed intact. The development of late-successional habitat within the Riparian Reserves and Late-Successional Reserves within the watershed would maintain and restore the distribution, diversity and complexity, of watershed and landscape-scale features and would contribute to long term cumulative recovery of the riparian and aquatic conditions within the Wolf Creek Watershed

ACS OBJECTIVE 2

Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include flood plains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.

Middle and lower Swamp Creek have a floodplain sufficient to create an unconfined valley. For some reaches, beaver have facilitated development of wetlands and improved stream floodplain connectivity. In other reaches, absence of structure (beaver dams and large wood) has contributed to channel incision into the valley floor, reducing connectivity. This pattern is common in Wolf Creek and throughout the 5th field watershed. Because of the low gradients the larger streams in the Fifth Field have the capacity to create and maintain floodplain connectivity; however, in the absence of structure such as beaver dams or large logs the channels often incise and the connectivity is reduced. In steeper areas of the basin, most notably in headwaters, the valleys are generally confined and the floodplain is not developed. Connectivity occurs mostly during peak flows.

The Proposed Action, Alternative 1, which includes density management within the Riparian Reserve, would maintain and restore spatial and temporal connectivity within and between watersheds by accelerating the development of mature and late-successional forest habitat locally within the Riparian Reserve.

There are fish bearing streams within the immediate project area, however, there are no fisheries refugia within the Wolf Creek Watershed. One culvert on Swamp Creek in the Project Area is a partial barrier to fish although fish are able to proceed upstream at certain flow levels. Movements of other aquatic species may be similarly affected. The Proposed Action would not change the existing connectivity of stream patterns or the accessibility of habitat to migratory fish.

No new spur or road construction would occur within the Riparian Reserve. The proposed action would use the existing 19-6-9.1 (B-Line road), 18-6-33 and 18-6-33.1 roads within the Riparian Reserve (see EA project map). The existing 18-6-33.1 road would require renovation before use. No new stream crossings would be added, maintaining the current connectivity for aquatic and riparian dependent species. Only existing roads would be used within the Riparian Reserve. All new spur construction in the upland would be temporary and would be decommissioned by subsoiling. Barricading and gating of some existing roads within the project area would reduce access to approximately 4.3 miles of existing road.

Alternatives 2 and 3, addressed in this EA, would maintain the current quality of connectivity within and between watersheds, with large conifer development within the Riparian Reserve continuing at a natural rate. Alternative 2 would require the same amount of temporary spur construction, road improvement and road renovation as Alternative 1. Alternative 3 is the no-action alternative.

ACS OBJECTIVE 3

Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.

Streams throughout Wolf Creek Watershed have been altered as a result of changes associated with early homesteading and forest management activities. Loss of large wood, reduced beaver activity, and development of extensive road network have had the most impact. The loss of large wood and beaver structure contributed to a decline in spawning gravels and pool quantity and quality. In particular, deeper pools and off-channel habitat has declined. Bank stability is generally good except where the channel has secondarily incised into the valley bottom and left exposed banks prone to erosion. The absence of larger conifer in riparian areas limits the capacity of the streams to recover on their own.

The Proposed Action, Alternative 1, would use variable width untreated stream buffers (minimum of 50 feet each side of the steam) to maintain the current physical integrity of the aquatic system including shorelines, banks, and bottom configurations. The variable width buffers would follow topographical features. Directional felling and no yarding across streams would be required to provide for streambank stability and water quality. Cable yarding with one end suspension would be required when yarding within Riparian Reserve to minimize soil disturbance.

The Proposed Action, which includes density management within Riparian Reserve, would accelerate the development of large conifers for future large wood contribution into the stream channels (providing more structure, cover, pools, and retention of gravel and small wood debris). In the long term this in-stream structure would provide for improved water quality by trapping sediments, stabilizing stream channels, and slowing high flows. This would improve fish habitat; increase the opportunity for exchange of ground water and stream water, and would maintain normal flooding of the floodplain.

All alternatives, including the Proposed Action, would protect streambanks, provide shade, and would contribute to maintaining current water quality, water temperature, and conditions of riparian and aquatic functions in these streams. This would include tempering of stream and riparian microclimates from edge effects, retaining slope stability and the associated protection from stream sedimentation, and maintaining litter inputs to streams and riparian areas.

There would be no new stream crossings, and no drainage network extensions due to new spur construction, road improvement, and road renovation within Alternatives 1 and 2. (Alternative 3 is the no-action

alternative). There are no slope stability concerns within the project area. All alternatives would protect a riparian associated wetland (headwater of stream 8 shown on EA map) and the habitat associated with it.

ACS OBJECTIVE 4

> **Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.**

No sources of contamination are known within the Wolf Creek 5th field watershed. The main water quality problem is elevated temperature, found mostly in main stem Wolf Creek below the project area. Localized increases in sediment that may occur in the Fifth Field Watershed as a result of landslides of channel failures may create problems for fish, depending on the timing, amount and duration. Problems with erosion are most likely to occur in the lower reaches of the Watershed. In Swamp Creek, the year round presence of coho and other salmonids indicate water quality conditions are suitable for salmonids.

Alternative 1, which includes density management within Riparian Reserve would accelerate the development of large conifers for future large wood contribution into the stream channels (providing more structure, cover, pools, and retention of gravel and small wood debris). This in-stream structure would improve water quality by trapping sediments, stabilizing stream channels, and slowing high flows. This would improve fish habitat; increase the opportunity for exchange of ground water and stream water, and would maintain normal flooding of the floodplain.

All alternatives would protect streambanks, provide shade, and would contribute to maintaining current water quality, water temperature, and conditions of riparian and aquatic functions in these streams. This would include tempering of stream and riparian microclimates from edge effects, retaining slope stability and the associated protection from stream sedimentation, and maintaining litter inputs to streams and riparian areas. These effects would contribute to the protection of water quality for fisheries within Swamp Creek (stream 20 on the EA map) and the fishbearing tributaries ((streams 6,15,18, and 12 on the EA map). All alternatives would maintain water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. All alternatives use Best Management Practices to reduce the potential for water quality problems.

ACS OBJECTIVE 5

> ***Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.***

The Coast Range in Wolf Creek 5th field watershed is dominated by marine sediments that weather to silt and sand. As a result, Wolf Creek and its tributaries are dominated by weathered sedimentary bedrock and fine particle material. Erosion potential varies through the 5th field watershed, being least in the headwaters or the eastern margin of the Coast Range, and increasing further down the watershed. Swamp Creek is in the transitional area for low to moderate erosion potential. Within Swamp Creek, erodibility increases in the headwaters above the project area, where several older slumps are present and surface erosion has increased as a result of recent activity on industrial forest lands.

There are no known slope stability concerns within the treatment area of all alternatives. There is no indication of recent slumping or channel failure. A past source of sediment was road 18-6-33.1 which was blocked to limit ORV. The road will be rehabilitated as part of the Proposed Action. ln alternatives and their associated management practices would not cause soil compaction capable of impairing overall stand growth, long term productivity or the hydrologic behavior of the treatment area.

All alternatives would maintain slope stability within the riparian providing protection in the project area from stream sedimentation and contributing to maintaining current water quality. None of the alternatives would contribute sediment to stream channels.
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Alternative 1, addressed in the EA, would use variable width untreated stream buffers (minimum of 50 feet each side of the steam) to maintain the current physical integrity of the aquatic system including shorelines, banks, and bottom configurations. The variable width buffers would follow topographical features. Alternative 1 would accelerate the development of large conifers for future large wood contribution into the stream channels (providing more structure, cover, pools, and retention of gravel and small wood debris). Long term, this in-stream structure would improve water quality by trapping sediments, stabilizing stream channels, and slowing high flows. This would improve fish habitat, increase the opportunity for exchange of ground water and stream water, and would maintain normal flooding of the floodplain.

Alternatives 2 and 3 addressed in this EA meet this ACS objective by leaving the Riparian Reserves untreated. The untreated Riparian Reserve would protect streambanks and side-slopes, retaining vegetation and slope stability and the associated protection from stream sedimentation. The development of large in-stream structure affecting sediment regime and its storage and transport would occur slower with these two alternatives.

All proposed temporary spur construction and road improvement, Alternatives 1 and 2, that are within the upland outside of the Riparian Reserve would have no hydrologic connection to the stream network. Temporary spurs would be subsoiled and would not over-winter. There would be some renovation of existing road (18-6-33.1) within the Riparian Reserve. Surface flows and related sediment from newly constructed spurs and road improvement within the project area would be routed and infiltrated into the adjacent heavily vegetated side slope soils. There would be no new stream crossings on these roads. Hydrologic connections are present along Road 18-6-33.1 but are well vegetated and have moderate slopes. Proposed temporary spur construction, road improvement, and road renovation are not expected to increase flows or sediment reaching the stream channels or impact aquatic resources.

There would be no increases in the drainage density from spur construction, road improvement, or road renovation, therefore there would be no increase in peak flows due to the spurs. Only existing roads would be used within the Riparian Reserve.

ACS OBJECTIVE 6

> ***Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.***

The Coast Range in the Wolf Creek 5th field watershed has limited groundwater storage due to limited valley deposits, downcutting of stream channels, and impervious substrate. As a result, flows are closely tied to storm events and recent precipitation patterns. Precipitation is 2-3 times greater in the lowest part of the watershed than it is in the headwaters. This contributes to the lower Watershed stream flows than is typical for other streams with a similar basin drainage area. The effective drainage network has increased as a result of extensive road development throughout the Watershed. The increase in drainage network tends to increase peak highs and reduce low flow levels.

Alternatives 1 and 2 would not cause any measurable increases in low flows since the residual trees would use the increase in available water. Any changes in flows would be small relative to the natural range of flows that occur due to storm events. Alternative 3, the “no-action” alternative would have no effect on flows.

Alternative 1 would accelerate the development of large conifers within Riparian Reserve for future large wood contribution into the stream channels. In the long term, this in-stream structure would provide for improved water quality and increased groundwater retention by trapping sediments, stabilizing stream

channels, and slowing high flows. This would improve fish habitat; increase the opportunity for exchange of ground water and stream water, and would maintain normal flooding of the floodplain. Future riparian restoration or silvicultural treatments may be necessary to accelerate long-term riparian recovery.

All proposed temporary spur construction and road improvement with Alternatives 1 and 2 are within the upland outside of the Riparian Reserve and would have no hydrologic connection to the stream network. Temporary spurs would be subsoiled and would not over-winter. There would be some renovation of existing road within the Riparian Reserve. Surface flows and related sediment from newly constructed spurs, road improvement, and road renovation within the project area would be routed and infiltrated into the adjacent heavily vegetated side slope soils. There would be no new stream crossings. All proposed temporary spur construction, road improvement, and road renovation would not deliver flow or sediment to stream channels or impact aquatic resources. There would be no increases in the drainage density from spur construction, therefore there would be no increase in peak flows due to the spurs.

The project area ranges in elevation from 840 - 1300 feet in elevation. An increase in flows related to a rain on snow (ROS) event within this elevation range of the Coast Range is not very likely since it is below the lower limit (1400-1700 ft.) for ROS in the Coast Range.

ACS OBJECTIVE 7

Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.

The floodplain development along Wolf Creek and the lower end of larger tributaries in the Wolf Creek 5th Field Watershed are generally good, a result of low gradient along Wolf Creek. Connectivity of Wolf Creek and the lower end of larger tributaries has been reduced by secondary channel incision of the valley floor due to loss of structure. Tributaries arising in steeper uplifting parts of the Coast Range, are confined with limited or no floodplain development. Within Swamp Creek, as its name implies, there have been extensive floodplain development and connectivity. Low gradient helps maintain the pattern, but loss of large wood and beaver dams contributed to channel incision and reduced connectivity.

Most streams adjacent to the treatment areas are small headwater streams lacking in flood plain development, however, Swamp Creek and an east tributary of Swamp Creek (stream 15 on the EA map) have flood plain development. All alternatives addressed in this EA meet this ACS objective by not altering existing patterns of floodplain inundation and water table elevation as there would be no effects or negligible effects on existing flow patterns and stream channel conditions downstream from the project area.

Alternative 1, which includes density management within Riparian Reserve would accelerate the development of large conifers for future large wood contribution into the stream channels in the long term (providing more structure, cover, pools, and retention of gravel and small wood debris). This in-stream structure would improve water quality by trapping sediments, stabilizing stream channels, and slowing high flows. This would improve fish habitat; increase the opportunity for exchange of ground water and stream water, and would maintain normal flooding of the floodplain.

All alternatives would maintain the water table elevation in the wetland at the headwaters of stream 8 on the EA map.

ACS OBJECTIVE 8

Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.

Riparian areas throughout the Wolf Creek 5th Field Watershed have been modified by management activities. The extensive road network has fragmented many riparian areas. Harvest activity removed the large conifer that was once dominant. Streamside vegetation is now dominated by brush, (esp. willow) and hardwoods. Only a few large conifers are present. In Swamp Creek, the pattern is similar to other parts of the 5th Field Watershed. Within the treatment area, younger aged conifer are found in the riparian, especially in the steeper headwater areas, while hardwoods and brush are most common along lower gradient fish bearing streams.

Alternative 1, which includes density management within the Riparian Reserve, would maintain and restore the species composition and structural diversity of plant communities in the riparian areas by accelerating the development of mature and late-successional forest habitat over the long term within the Riparian Reserve. Density management within the Riparian Reserve above the "no-treat" stream buffers would accelerate the development of large conifers in the riparian which would provide a future source of large in-stream structure (providing more structure, cover, pools, and retention of gravel and small wood debris) and down wood within the riparian. Alternative 1 would provide additional down wood in the Riparian Reserve above the no-treat stream buffers

Alternatives 2 and 3 meet this ACS objective by maintaining untreated Riparian Reserves, thus maintaining existing plant communities. Habitat for riparian related species would not be changed. The development of late-successional habitat would occur slower with these two alternatives.

All alternatives would retain Pacific yew, western red cedar, and hardwoods. Alternatives 2 and 3 would maintain the greatest protection of these species from management actions, however, Alternative 1 would thin the overstory within the Riparian Reserve increasing the available light to these minor species and vegetation in the understory promoting structural and species diversity within the Riparian Reserve. Riparian vegetation would continue to maintain shading and bank stability with all alternatives. All alternatives would maintain the structural diversity of plant communities in the riparian associated wetland (headwater of stream 8 shown on EA map).

All alternatives would retain all down material of advanced decay (Decay Class 3, 4 or 5) for coarse woody debris (CWD). All alternatives would retain existing snags to provide habitat for cavity dependent wildlife. (In the event snags are required to be felled for safety reasons they would be retained on site as down wood.)

ACS OBJECTIVE 9

Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.

As discussed in ACS objective 8, the riparian communities have changed throughout the 5th Field Watershed. The changes in riparian communities have contributed to the changes in the aquatic system (ACS objective 3). The basic plant and animal communities in the riparian and aquatic systems are still present although numbers and distribution have changed.

Alternative 1, which includes density management within the Riparian Reserve, would maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species by thinning the forested stands within the Riparian Reserve, accelerating the development of mature and late-successional forest habitat.

All alternatives addressed in the EA would maintain and/or enhance connectivity and habitat conservation for organisms that are dependent on the transition zone between upland and riparian areas. Development of late-successional habitat in Riparian Reserves with Alternatives 2 and 3 would occur slower than with Alternative 1, being entirely dependent on natural disturbance and forest succession processes.

All alternatives would improve travel and dispersal corridors for many terrestrial animals and plants, and would contribute to a network of connectivity corridors (Riparian Reserves) between and within the Late-Successional Reserves within the watershed and between watersheds over the long term. Alternative 1 would achieve this objective more quickly than Alternatives 2 and 3.

VIII. CONSULTATION AND COORDINATION

A. PROJECT DEVELOPMENT

The proposed action and alternatives were developed and analyzed by the following interdisciplinary team of BLM specialists:

Barry Williams	BLM Soil Scientist
Mark Stephen	BLM Forest Ecologist
Gary Cairns	BLM Engineer
Dave Reed	BLM Fuels Specialist
Michael Southard	BLM Archaeologist
Phil Redlinger	BLM Silviculturist and Timber Planner
Al Corbin	BLM Timber Manager
Dan Crannell	BLM T & E and Wildlife Biologist
Russ Hammer	BLM Fisheries Biologist
Gary Wilkinson	BLM ARD/GIS Specialist
Kathy Pendergrass	BLM Botanist
Saundra Miles	BLM Recreation Planner - Visual Resources
Gary Hoppe	BLM Planning and Environmental Coordination
Graham Armstrong	BLM Hydrology

B. CONSULTATION

UNITED STATES FISH AND WILDLIFE SERVICE (USFWS)

Pursuant to the Endangered Species Act, formal consultation was completed with the U.S. Fish and Wildlife Service (USFWS) on this proposed action. The USFWS issued its Biological Opinion on October 23, 1998, completing consultation. According to that Biological Opinion, B-Happy would "*May Affect, but is Not Likely to Adversely Affect"* the northern spotted owl due to modification of dispersal habitat within the unit. There would be approximately 80% of federal lands in a dispersal condition before and after treatment within the quarter township. This proposal would have a *"No Affect"* on the marbled murrelet and other federally listed/proposed terrestrial species.

NATIONAL MARINE FISHERIES SERVICE (NMFS)

Pursuant the Endangered Species Act, consultation will be conducted with the National Marine Fisheries Service (NMFS) to evaluate the effects of the Proposed Action on coho salmon (*Oncorhynchus kisutch*) by applying the standards of Section 7(a) (2). The sale contract will not be awarded until a final biological opinion or letter of concurrence, which includes a non-jeopardy determination, has been received. The sale was designed to follow the guidance of the Eugene District Resource Management Plan which incorporates the ACS objectives within the Northwest Forest Plan, and to incorporate mitigation identified in the consultation on previous listed salmonids, as appropriate.

CONFEDERATED TRIBES

The Bureau of Land Management, Coast Range Resource Area consulted with the Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians as part of the cultural inventory to be conducted in conjunction with the environmental analysis process for the Fiscal Year 1998 and 1999 proposed timber sale program. A letter was sent on September 24, 1997. No response was received.

IX. REFERENCES

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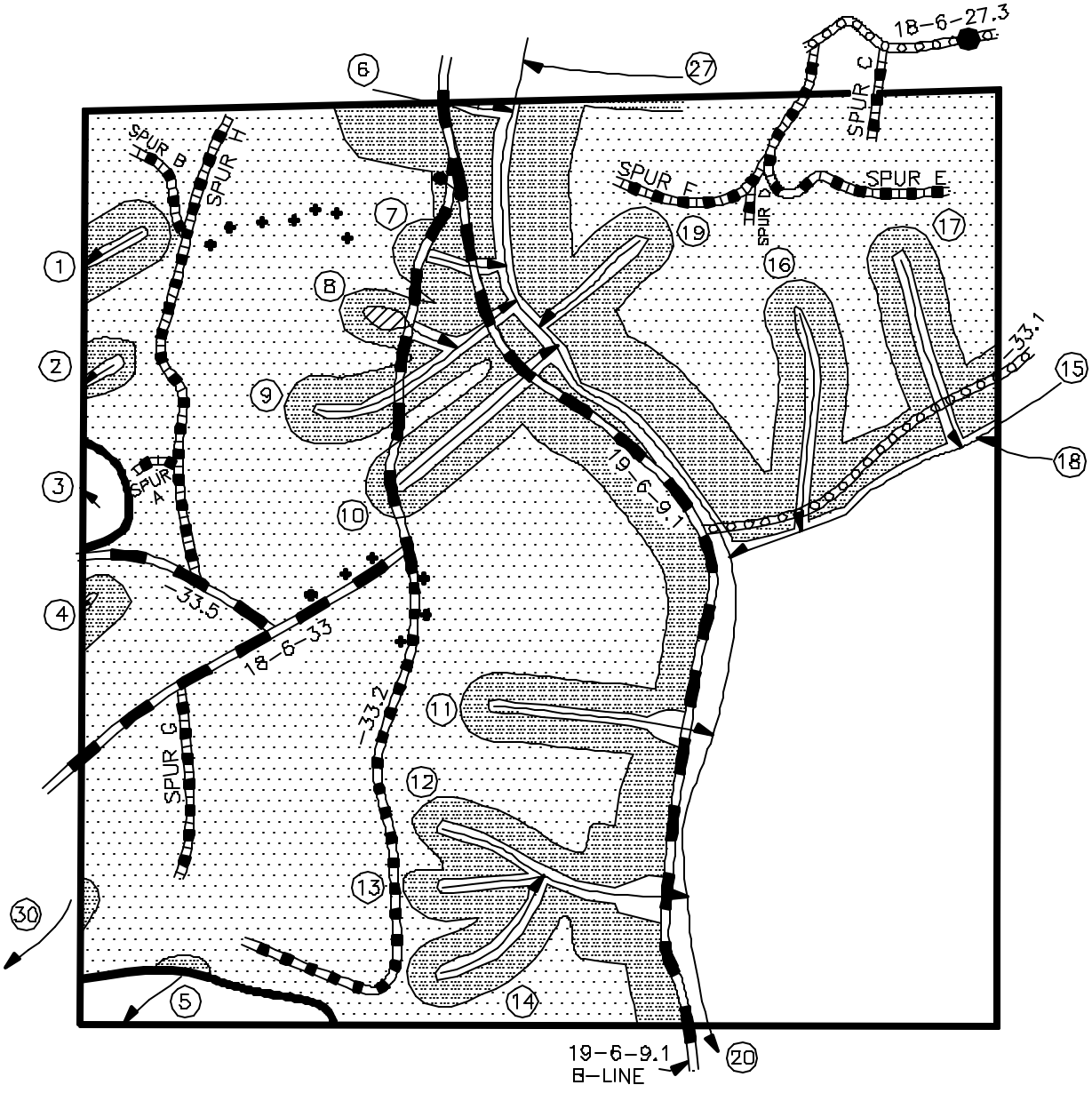
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

B–HAPPY EA MAP

T. 18S. , R. 6W , SEC. 33 , WILL. MER., EUGENE DISTRICT



SCALE: 1" = 1,000 FT.

LEGEND

- RIPARIAN RESERVE
- NO TREAT AREA
- WETLAND AREA
- TREATED UPLAND AREA
- GATE
- PROPOSED TANK TRAP
- (1) STREAM ID
- ADD PLUS TREES 1689–1694, 1793–1798
- EXISTING ROADS
- TEMPORARY SPUR CONSTRUCTION
- ROAD TO BE IMPROVED
- ROAD TO BE RENOVATED

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
EUGENE DISTRICT OFFICE

Preliminary Finding of No Significant Impact for B-Happy Commercial Thinning

Determination:

On the basis of the information contained in the Environmental Assessment, and all other information available to me, it is my determination that implementation of the proposed action or alternatives will not have significant environmental impacts beyond those already addressed in the *Record of Decision (ROD) for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (April 1994), and the *Eugene District Record of Decision and Resource Management Plan* (June 1995) with which this EA is in conformance, and does not, in and of itself, constitute a major federal action having a significant effect on the human environment. Therefore, an environmental impact statement or a supplement to the existing environmental impact statement is not necessary and will not be prepared.